

Guidelines for Euthanasia of Amphibians, Fish, and Reptiles

From the Office of the Attending Veterinarian, University of Pittsburgh
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Use of Tricaine Methane Sulfonate (MS 222, TMS)

MS 222 is commercially available as Tricaine Methane Sulfonate (TMS), which can be used for the euthanasia of amphibians and fish. A solution of MS222 that is not buffered to neutral pH is acidic, predominantly ionized, and poorly absorbed, resulting in a prolonged induction time. Moreover, an acidic solution causes an escape behavior in frogs as it probably acts as a painful irritant to their skin.

For these reasons the AVMA Guidelines on Euthanasia 2007 provides the following advice concerning the preparation of MS222:

Tricaine is a benzoic acid derivative and, in water of low alkalinity (< 50 mg/L as CaCO₃); the solution should be buffered with sodium bicarbonate. A 10 g/L stock solution can be made, and sodium bicarbonate added to saturation, resulting in a pH between 7.0 and 7.5 for the solution. The stock solution should be stored in a dark brown bottle, and refrigerated or frozen if possible. The solution should be replaced monthly and any time a brown color is observed. All bottles should be labeled and provide the expiration date.

Cooling, Hypothermia, Ice Immersion or Rapid Freezing in Aquatics and Reptiles

If used, animals must be anesthetized prior to freezing. Quick freezing of deeply anesthetized animals is acceptable. Rapid freezing as a sole means of euthanasia is not considered to be humane. It has been suggested that, when using physical methods of anesthesia or euthanasia in ectothermic (poikilothermic) species, cooling to 4° C will decrease metabolism and facilitate handling, but there is no evidence that whole body cooling reduces pain or is clinically efficacious. Individual and species variation combined with the current incomplete understanding of pain perception processing in these species' nervous system, make hypothermia an inappropriate anesthetic and an unacceptable method for euthanasia. Immobilization of amphibians and reptiles by cooling is considered inappropriate and inhumane even if combined with other physical or chemical methods of euthanasia. This method is not recommended. Formation of ice crystals on the skin and in tissues of an animal may cause pain or distress.